

SPWLA Newsletter

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SPWLA Japan Chapter

No.37 August 2001

7th Well Logging Symposium

The 37th Chapter Meeting

About the Paper

Announcement of 7th Symp.

The Seventh Well Logging Symposium of Japan

The Seventh Well Logging Symposium of Japan will be held at the Technology Research Center-Japan National Oil Corporation, Chiba on September 27-28, 2001. All persons involved with the Oil, Gas, Geothermal Energy and Geoengineering industry and research institutes are invited to attend the symposium.

Mark your calendar now to attend the Seventh Well Logging Symposium of Japan.

Pre-registration is due no later than September 17, 2001. For details, please refer to "**Pre-registration Brochure**" distributed on August 7th. If you do not receive the Brochure, please contact to Ms. Yukiko Hoshino (yukiko@tokyo.oilfield.slb.com).

Invitation to 37th Chapter Meeting

We would like to announce that the forthcoming Chapter Meeting will be held as follows. This meeting is co-sponsored by JAPT (Japanese Association of Petroleum Engineer).

Venue : Conference Room(14th floor) in INPEX
Ebisu Neonato, 4-1-18, Ebisu,
Sibuya-ku, Tokyo
Tel: 03-5448-1201

Date : Monday, September 3rd, 2001

Program:

13:00 – 16:00

- 1) Carbonate Reservoir Models: Coupling Depositional Sequence and Pore Network Models in Static 3D Realizations
- 2) Turbidite and Deepwater Depositional Systems of Borneo: Evolving Foredeep Slope and Basin-Floor Fan Systems

By **Dr. Paul Crevello** (AAPG Distinguished Lecturer)
* Presentations in English

Fee: JPY 1000

About of the Speaker and Topics:

See the next page

ABSTRACTS

Paul D. Crevello

Petrex-Asia Reservoir and Stratigraphy Consultants Brunei SE Asia

**Carbonate Reservoir Models: Coupling Depositional Sequence
and Pore Network Models in Static 3D Realizations**

The future of reservoir technology will be in the area of improving the definition of resources through enhanced imaging of reservoir bodies and/or fluids and incorporation of fully integrated asset studies. Advances in detection and visualization technologies are leading the next generation of models towards realistic 3D geologic realizations of reservoir systems. Coupled with integrated studies, the next generation models will offer the opportunity to provide our most robust calibration to date of static geology-based 3D models. However, the models will only be as robust as their calibration. The error often seen in today's generation of reservoir models, and predicted to linger, is not created by the lack of imaging techniques but from the lack of fully utilizing supporting integrated data.

The objectives of reservoir models are to resolve reservoir bodies and properties (ϕ , k , sat) to a level that accurately define rock elements and fluid distribution, to place the reservoir body into a robust 3D geologic-based framework, and to provide a static reservoir model that serves as the framework for upscaling to multiple scenario dynamic simulations.

Reservoir stratigraphy is one type of approach that provides the technology asset team with a framework to define reservoir architecture, encompassing the spatial distribution of reservoir bodies, aspect ratios, barriers, conduits and connectivity. A common ingredient of reservoir models is to define reservoir systems in terms of genetically related stratigraphic elements. However, body imaging, resolution and calibration of rock attributes, in particular rock architecture and pore network, with logs and seismic are and will continue to be the principle hurdles of future reservoir models. Complex carbonate lithologies and pore networks require key subsurface core sets for robust calibration of well log and imaging attributes, the principle tools used for building models.

Rock calibration with cores is essential for coupling stratigraphic and pore network elements into reservoir architecture and for achieving robust model-realizations.

The state of carbonate reservoir modeling is rapidly approaching the stage where realistic models of 3D high-resolution definition of reservoir architecture will become a common task. Outcrop and shallow high-resolution studies provide guides for developing better and more realistic geology-based reservoir models. Often low-resolution imaging of the reservoir body or constraints imposed by up-scaling dilute the geologic complexities of the model, but this does not necessarily negatively impact the model; numerous factors dictate the degree of complexity, or geologic reality, required in the model.

In this talk, I will present lessons learned from case studies of reservoir models, where a number of calibrated data sets have been applied on models of reservoir flow units, barriers and flow simulations. Critical production concerns addressed include fluid types, communication or isolation, fracture potential and vertical encroachment across permeability baffles and barriers, stratal geometries of reservoir conduits and aquifers. Each example has a different reservoir aspect, whether it's the reservoir body, fluid or aquifer that affects final field development strategy. Improved imaging and detection of reservoir bodies, combined with robust calibration, will result in robust static model realizations, which will enable subsequent dynamic reservoir simulations to assess the critical uncertainties facing future reservoir development and management.

Turbidite and Deepwater Depositional Systems of Borneo: Foredeep Slope and Basin Floor Fan Systems

Turbidites are relatively new exploration targets in deep-water plays of Southeast Asia, viz. the Mahakam and Baram Deltas and NW Sabah Shelf, where new reservoir sands with sustainable high flow rates have been discovered. However, prediction and imaging of hydrocarbon-charged sands in complex structurally active sedimentary basins has led to a low number of total discoveries. Enhanced imaging of pay sands or predicting sand fairways is complicated by shifting receptacle basins and structural deformation of reservoirs; and challenged by detection of optimal reservoirs, continuity and vertical connectivity of reservoir sand systems. Knowledge about the hinterland source area, shelf-staging area, sand influx and distribution mechanisms are poorly constrained because of the complicated tectonic and prolonged turbidite basin history of Borneo.

Vast areas of Borneo persisted as a deep-water turbidite systems throughout much of the Paleogene. The Rajang Turbidite Group, which forms the backbone of Borneo, was deposited in a foredeep basin during the Cretaceous to Eocene. Younger turbidite systems of the West Crocker, Temburong and Setap Formations occur in outcrop and offshore NW Borneo, and important hydrocarbon-bearing turbidite sequences occur in offshore regions of the Miocene-Pleistocene Kutei, Baram and NW Sabah basins.

Two systems worthy of note were deposited in turbidite basins of Borneo: the West Crocker submarine fan and the Neogene turbidite systems; these range from Middle-Late Oligocene to Middle Miocene and Middle Miocene in outcrop to Pliocene-Pleistocene, respectively, in the offshore hydrocarbon provinces. These turbidite systems provide examples of slope canyon feeder systems, ponded slope basins and basin floor 'unconfined' systems.

The Crocker Formation is a 'classic unconfined' foredeep basin-floor submarine fan complex. The fan was deposited in a foredeep trough that extended for several hundred kilometers along the Borneo trench. Sand-rich channel-sheet complexes exceed 300 m in thickness and the entire fan system extends over 12,000 sq km, rivaling in size and sand volume world-class submarine fan systems. Individual channel axis sands rarely exceed 3-5 m, while channel and sheet sands are amalgamated into 30-60 meters thick multistory sand complexes. Mud-rich levees are less

evident, and the high net:gross supports a sand-rich system. The regional extent of the fan indicates an extensive complex of off-lapping, 'unrestricted' channel-lobe fans. Uplift of Paleogene turbidite sands, like the Crocker, provided the source for much of the recycled sands of the Neogene turbidite systems.

The Neogene turbidite systems formed in ponded basins and unconfined basin floor fans around the peripheral basins of Borneo. These systems recorded clearer linkage between sedimentation and tectonics. Turbidite channel sands and lobes thin and onlap or are truncated along active seafloor structures, faults and shale diapirs. Depositional cycles contain megaslumps, olistoliths and debris flows alternating with channel and sheet/lobe sands. Individual channel and sheet sands rarely exceed 3 m while amalgamated multistory sands typically range between 10 to 30 m. Linkage with lowstand shelf-edge deltas and/or tectonic episodes with optimal reservoir sand quality, input and shelf bypass is recorded in the Neogene systems. Subsurface and outcrop examples and selected analog studies displaying 2D and 3D aspects of turbidite fan systems, especially reservoir elements and seismic and well log facies attributes, will be used to elucidate the turbidite systems of Borneo.

— Paul D. Crevello —

Education

- 1972-75 University of Miami, Miami, Florida USA; B.S. in Geology
- 1975-78 Rosentiel School of Marine Sciences, Miami, Florida USA; M.S. in Geology & Geophysics
- 1983-89 Colorado School of Mines, Golden, - Colorado USA; PhD in Geology

Experience

- 1978-94 Marathon Oil Company, Denver Research Center, Colorado USA; Research Geologist
- 1994-97 University of Brunei, Brunei, SE Asia; Senior Lecturer
- 1997-present PetrexAsia Reservoir and Stratigraphy - Consultants, Brunei SE Asia; Principal

Twenty-three years experience as international *Stratigraphic and Reservoir Geological Specialist:*

- Integrated 3-D static and dynamic - reservoir modeling of reservoirs;
- 2D and 3D work-station based seismic interpretation;
- Sedimentology and sequence stratigraphy of carbonate and clastic depositional systems;
- Syntectonic stratigraphy of delta and turbidite systems;
- Regional and reservoir scale sequence stratigraphy;

- Core and log evaluation, petrography, diagenesis, and reservoir outcrop studies.

Professional Interests

- High-resolution visualization of carbonate and clastic reservoirs
- SCUBA and submersible studies of modern carbonate platform fore-reef and slope systems
- Subaerial exposure effects on carbonate reservoirs in core, logs and seismic
- Carbonate rock-fabric and pore network calibration and quantification of reservoir systems
- Turbidite systems of Borneo

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Memberships

American Association of Petroleum Geologists
Society of Sedimentary Geology
SEAPEX
Indonesia Petroleum Association
Malaysia Geological Society

['94-'95 Annual schedule of Chapter Meetings]

May 23, 1994 *Japan National Oil Corporation*
July 25, 1994 *Japan Petroleum Exploration Co.,Ltd*
September 27, 1994 *Japan Oil Engineering Co.,Ltd*
November 29, 1994 *Technical Research Center, Teikoku Oil Co.,Ltd*
January 23, 1995 *Indonesia Petroleum, Ltd.*
March 13, 1995 *Waseda University*
May 29, 1995 *Japan Oil Development Co.,Ltd*
September 21-22, 1995 *Technology Research Center, Japan National Oil Corporation*

['95-'96 Annual schedule of Chapter Meetings]

November 27, 1995 *Idemitsu Oil Development Co.,Ltd*
January 29, 1996 *Geothermal Energy R& D Co.,Ltd*
March 26, 1996 *Arabian Oil Co.,Ltd*
May 27, 1996 *Japan Petroleum Exploration Co.,Ltd*
September 26-27, 1996 *Technology Research Center, Japan National Oil Corporation*

['96-'97 Annual schedule of Chapter Meetings]

November 25, 1996 *Technical Research Center, Teikoku Oil Co.,Ltd*
January 27, 1997 *Indonesia Petroleum, Ltd.*
March 26, 1997 *Waseda University*
May 26, 1997 *Japan Oil Development Co., Ltd.*
September 24-25, 1997 *Technology Research Center, Japan National Oil Corporation*

['97-'98 Annual schedule of Chapter Meetings]

November 25, 1997 *Idemitsu Oil Development Co.,Ltd*
January 26, 1998 *Geothermal Energy R& D Co.,Ltd*
March 30, 1998 *Schlumberger K.K.*
May 25, 1998 *Japan Petroleum Exploration Co.,Ltd*
September 24-25, 1998 *Technology Research Center, Japan National Oil Corporation*

['98-'99 Annual schedule of Chapter Meetings]

November 27, 1998 *Technical Research Center, Teikoku Oil Co.,Ltd*
January 27, 1999 *Indonesia Petroleum, Ltd.*
March 31, 1999 *Waseda University*
May 25, 1999 *Tohoku University*
September 29-30, 1999 *Technology Research Center, Japan National Oil Corporation*

['99-'00 Annual schedule of Chapter Meetings]

November 29, 1999 *Mitsui Oil Exploration Co., Ltd.*
January 31, 2000 *Idemitsu Oil & Gas Co., Ltd.*
March 27, 2000 *Geothermal Energy R&D Co., Ltd.*
May 22, 2000 *Japan Petroleum Exploration Co.,Ltd.*
September 26-27, 2000 *Technology Research Center, Japan National Oil Corporation*

['00-'01 Annual schedule of Chapter Meetings]

December, 4, 2000 *Schlumberger K.K.*
March 21, 2001 *Teikoku Oil Co.,Ltd*
May 8, 2001 *Japan Petroleum Exploration Co.,Ltd*
September 3, 2001 **INPEX**
September 27-28, 2001 *Technology Research Center, Japan National Oil Corporation*

The Seventh Well Logging Symposium of Japan

JNOC-TRC, Chiba, September 27-28, 2001

Announcement

Sponsored by Japan Chapter of Society of Professional Well Log Analysts
Cosponsored by Technology Research Center, Japan National Oil Corporation
Supported by Japanese Association for Petroleum Technology
Society of Exploration Geophysicist of Japan
Geothermal Research Society of Japan
Society of Petroleum Engineers, Japan Section
Subsurface Instrumentation Division of MMIJ

The Seventh Well Logging Symposium of Japan will be held at the Technology Research Center-Japan National Oil Corporation, on September 27-28, 2001. All persons involved with the Oil, Gas, Geothermal Energy and Geoengineering industry and research institutes are invited to the symposium

VENUE : Technology Research Center
Japan National Oil Corporation
1-2-2, Hamada, Mihama-ku, Chiba 261

TENTATIVE PROGRAM

September 27

10:00 - 11:00 **Opening Session**
11:00 - 11:40 Technical Session **1 Acoustic/Borehole Seismic**
13:00 - 14:40 Technical Session **2 Reservoir Characterization**
15:10 - 16:40 Technical Session **3 General Formation Evaluation-1**
16:40 - 17:20 **General Meeting**
17:30 - 19:00 Ice Breaker Cocktail Party

September 28

09:40 - 12:00 Technical Session **4 New Tool**
13:00 - 15:00 Technical Session **5 General Formation Evaluation-2**

REGISTRATION FEE (include the Proceedings)

	Pre-Registration(by Sep. 17)	On Site Registration
Member or Speaker	2000 yen	3000 yen
Non-member	3000 yen	4000 yen
Student	free	1000 yen
Icebreaker Cocktail Party	3000 yen	

For the Pre-Registration, no advance payment is necessary, please contact to;

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営団地下鉄日比谷線 恵比寿 駅下車徒歩5分

駐車場: お車で越しの際は、建物の地下1階の時間貸駐車場をご利用
願います (駐車場は 21:00 で閉まりますので、ご留意願います)。

